

1
2 NETWORK-BASED SYSTEM EMPLOYING AN APPLICATION SERVER THAT
3 PROVIDES INTEGRATED MULTIPARTY INVOICE PROCESSING

4

5 BACKGROUND OF THE INVENTION

6

7 1. Field of the Invention

8 This invention relates broadly to electronic-based commerce systems and
9 methods. More particularly, this invention relates to electronic-based invoicing systems
10 and methods.

11

12 2. State of the Art

13 In a typical commercial transaction between a seller of goods and/or services and
14 a buyer of such goods and services, the seller creates an invoice for such goods and
15 services that is presented to the buyer for payment by the buyer. Traditionally, the
16 invoice is created by the seller, printed out in paper form and mailed to buyer. Upon
17 receipt, the invoice is typically routed through an approval process at the buyer (requiring
18 review by one or more individuals or departments within the buyer's organization). The
19 invoice may be disputed by the buyer (requiring adjustment to the invoice, and the
20 process begins again) or may be approved by the buyer. Once payment is authorized, the
21 buyer issues a payment instrument (such as a check) and sends the payment instrument to
22 the seller, seller's bank, or other entity of the seller for payment processing. This entire
23 process may take several weeks and requires separate accounting records to be kept and
24 harmonized at both the seller (accounts receivable) and the buyer (accounts payable).

1

2 With the advent of the Internet (and other distributed network technologies),
3 electronic-commerce systems have been developed that streamline the traditional
4 invoicing process by enabling electronic presentment of invoices as well as electronic
5 payment of such invoices. An example of such a system is described in U.S. Patent
6 Application Publication US 2003/0004874, published Jan 2, 2003. In this system, a biller
7 system loads a batch invoice file into the system via an invoice loader. The invoices of
8 the batch invoice file are loaded into a database. An application server enables a biller
9 system user operating a web browser to interact with the application server over the
10 Internet. Such biller-side interaction enables querying the invoices stored in the database,
11 displaying the details of a selected invoice, sending messages (such as text messages and
12 e-mail messages) to the payer associated with an invoice, adjusting and allowing an
13 invoice, and performing other actions associated with the stored invoices. In addition, the
14 application server enables a payer system user operating a web browser to interact with
15 the application server over the Internet. Such payer-side interaction enables querying the
16 invoices stored in the database, displaying the details of a selected invoice, reviewing and
17 approving part or all of an invoice, initiating payment of an invoice, and performing other
18 actions associated with the stored invoices. Such a system enables efficient presentment
19 of invoices to the payer (buyer) and efficient payment of such invoices; however, the
20 system requires a separate and distinct application executed by the biller (seller) for
21 managing the information from which the invoices are derived and for creating invoices.
22 This increases the total cost of the solution.

23

1

2 Thus, there remains a need in the art for an improved electronic-commerce system
3 that provides for seller-side processing that enables maintenance of billing information
4 and creation of invoices derived from such billing information as well as buyer-side
5 processing that enables efficient approval and payment of invoices, to thereby provide for
6 a lower cost electronic-based invoicing solution.

7

8 SUMMARY OF THE INVENTION

9

10 It is therefore an object of the invention to provide an improved electronic-
11 commerce system that provides seller-side processing that enables maintenance of billing
12 information and creation of invoices derived from such billing information as well as
13 buyer-side processing that enables efficient approval and payment of invoices.

14

15 It is another object of the invention to provide such an improved electronic-
16 commerce system utilizing an application server framework that provides for network-
17 based seller-side access as well as network-based buyer-side access.

18

19 It is a further object of the invention to provide such an improved electronic-
20 commerce system wherein seller-side access and buyer-side access occur in real time
21 over network connections to an application server framework.

22

1 In accord with these objects, which will be discussed in detail below, a system
2 (and corresponding method) operates in conjunction with the sale of goods and/or
3 services provided by a first entity to a second entity. The system (and corresponding
4 method) provides for electronic presentment of bills and invoices related to such
5 sales/transactions. It includes a first means for authenticating at least one first-entity-
6 class user and second means for authenticating at least one second-entity-class user. An
7 application server includes a first application component that interacts in real-time over a
8 network with an authenticated first-entity-class user to enter, create, maintain, and store
9 billing information and related invoices pertaining to at least one second entity. A second
10 application component interacts in real-time over the network with an authenticated
11 second-entity-class user to access portions of the billing information and related invoices
12 pertaining to the authenticated second-entity-class user. The first application component
13 and the second application component operate in conjunction with data security logic to
14 selectively control first-entity class user access and second-entity-class user access to the
15 billing information and related invoices maintained by the system.

16

17 It will be appreciated that electronic-based invoicing systems in accordance with
18 the present invention enables efficient approval and payment of invoices. Moreover, the
19 highly integrated architecture of such systems provides for a lower cost invoicing
20 solution to both sellers and buyers and thus opens up new markets for such advanced
21 invoicing functionality.

22

1 According to the preferred embodiment of the invention, the first application
2 component enables access to particular billing information by at least one authenticated
3 second-entity-class user in response to finalization of the particular billing information,
4 wherein the finalization is accomplished by interaction with an authenticated first-entity-
5 class user. Moreover, the first application component and second application component
6 are preferably adapted such that the particular billing information cannot be added to an
7 invoice until approved by an authenticated second-entity-class user. In addition, the first
8 application component preferably enables access to particular invoice information by at
9 least one authenticated second-entity-class user in response to posting of the particular
10 invoice information, which is accomplished by interaction over the network with an
11 authenticated first-entity-class user.

12

13 Additional objects and advantages of the invention will become apparent to those
14 skilled in the art upon reference to the detailed description taken in conjunction with the
15 provided figures.

16

BRIEF DESCRIPTION OF THE DRAWINGS

2

3 Fig. 1 is a block diagram of an electronic bill presentment and invoice processing
4 system in accordance with the present invention;

5

6 Fig. 2 is a block diagram of the functionality provided by the subscriber-

7 administrator logic of the application server of Fig. 1 in accordance with the present
8 invention.

9

10 Figs. 3A - 3E are pictorial illustrations of exemplary graphical user interfaces that
11 may be displayed at the browser-based subscriber-administrator system as part of the
12 processing provided by the subscriber-administrator logic of Fig. 2 in accordance with
13 the present invention.

14

15 Figs. 4A - 4I are pictorial illustrations of exemplary graphical user interfaces (or
16 reporting view(s)) that may be displayed at the browser-based subscriber-administrator
17 system as part of the processing provided by the subscriber-administrator logic of Fig. 2
18 in accordance with the present invention.

19

1 Fig. 5 is a block diagram of the functionality provided by the subscriber-staff
2 logic of the application server of Fig. 1 in accordance with the present invention.

3

4 Fig. 6 is a block diagram of the functionality provided by the client-administrator
5 logic of the application server of Fig. 1 in accordance with the present invention.

6

7 Figs. 7A - 7D are pictorial illustrations of exemplary graphical user interfaces (or
8 reporting view(s)) that may be displayed at the browser-based client-administrator system
9 as part of the processing provided by the client-administrator logic of Fig. 6 in
10 accordance with the present invention.

11

12 Fig. 8 is a block diagram of the functionality provided by the client-staff logic of
13 the application server of Fig. 1 in accordance with the present invention.

14

15 Fig. 9 is a schematic diagram that illustrates various states of a billing entry
16 through the invoicing process carried out by the invoicing system of Fig. 1 in accordance
17 with the present invention.

18

19 Fig. 10 is a schematic diagram that illustrates various states of an invoice through
20 the invoicing process carried out by the invoicing system of Fig. 1 in accordance with the
21 present invention.

22

1 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS
2

3 Turning now to Fig. 1, there is shown the architecture of an electronic invoicing
4 system 1 in accordance with the present invention. There are two classes (denoted
5 “Subscribers” and “Clients”) of users of the system. One or more Subscribers, which
6 belong to a Subscriber entity, access the system over a network (such as the Internet) to
7 enter/create, update, store and view billing information (in electronic form) that is related
8 to goods and/or services provided to one or more Clients. One or more Subscribers also
9 access the system over the network to electronically present such billing information to
10 the appropriate Client for review and approval by the Client. One or more Clients, which
11 belong to a Client entity, access the system to review and approve (or disapprove) the
12 bills electronically-presented thereto by the Subscriber(s). In this manner, the system
13 enables centralized creation and management of the billing information and invoices by
14 the Subscriber(s) as well as network-based collaboration that enables efficient
15 presentation, approval, and possibly payment of invoices by the Client(s).

16

17 The Subscriber(s) of the system have a hierarchical logical organization including
18 one or more Subscriber Administrators and zero or more Subscriber Staff Members. The
19 Subscriber Administrator(s) has full access to the billing information maintained by the
20 system for the particular Subscriber, and can create and maintain certain user-
21 configurable aspects of the system for the particular Subscriber. The Subscriber Staff
22 Member(s) are created and maintained by the Subscriber Administrator(s) and have
23 limited access to the billing information maintained by the system for the particular

1 Subscriber. For example, in the preferred embodiment of the present invention, the
2 Subscriber Staff Member can only view and update billing information that was
3 originally created by the Subscriber Staff Member.

4

5 Similarly, the client(s) of the system have a hierarchical logical organization
6 including one or more Client Administrators and zero or more Client Staff Members.
7 The Client Administrator(s) has limited access (for example, access granted only upon
8 submission by the Subscriber to the Client for approval as described below) to the billing
9 information maintained by the system for the particular Client, and can create and
10 maintain certain user-configurable aspects of the system for the particular Client. The
11 Client Staff Member(s) are created and maintained by the Client Administrator(s) and
12 have limited access to the billing information maintained by the system for the particular
13 Client. For example, in the preferred embodiment of the present invention, the Client
14 Staff Member can only view and update billing information that was submitted by the
15 Subscriber to the Client for approval and that is associated with a location (e.g.,
16 Department, Division, Branch Office, etc.) of the Client submitted by the Subscriber to
17 the Client for approval originally created by the Subscriber Staff Member.

18

19 As shown in Fig. 1, the Subscriber Administrator(s) and Subscriber Staff
20 (commonly referred to herein as Subscriber Administrator/Staff) utilize a web browser
21 executing on a computing device 3 to connect to a web server 5 over the network 7 (e.g.,
22 Internet). Similarly, the Client Administrator(s) and Client Staff (commonly referred to
23 herein as Subscriber Administrator/Staff) utilize a web browser executing on a computing

1 device 9 to connect to the web server 5 over the network 7. Preferably, the browser-
2 based interaction between the computing devices 3, 5 and the web server 5 occur over
3 TCP/IP sessions established therebetween over which are communicated HTML-based
4 (and possibly XML-based) documents and commands as well as other messages,
5 commands and data. The web server 5 enables login and authentication of Subscriber
6 Administrator/Staff via interaction with the Subscriber system 3 as well as login and
7 authentication of Client Administrator/Staff via interaction with the Client system 9.
8 Such login and authentication can utilize password-based authentication, operating
9 system-based authentication (e.g., NTLM or Kerberos); services-based authentication
10 (e.g., Microsoft Passport authentication), certificate-based authentication, or any other
11 authentication scheme. Once a user session has been authorized (whether it be a
12 Subscriber Administrator/Staff session or Client Administrator/Staff session), the web
13 server 5 communicates with an Application Server 11 to build dynamic web page(s)
14 based on data supplied by the Application Server 11 and serve the dynamic web page(s)
15 to the Subscriber Administrator/Staff web browser (or the Client Administrator/Staff web
16 browser) as requested, and forward (and/or transform) data supplied by the Subscriber
17 Administrator/Staff web browser (or Subscriber Administrator/Staff web browse) to the
18 Application Server 11 as needed. Preferably, the web server 5 is located in a
19 “demilitarized zone” (DMZ) provided with a firewall router 13. In, this configuration,
20 the firewall/router 13 enables authorized communication between the web server 5 and
21 the Application Server 11 (typically utilizing a secure socket layer (SSL) interface or an
22 IPSec interface), while blocking unauthorized communication requests to the Application
23 Server 11. In addition, the web server 5 preferably utilizes style sheets to build the

1 HTML documents (and XML documents) for presentment to the Subscriber
2 Administrator/Staff web browser (or Subscriber Administrator/Staff web browse). The
3 web server 5 may be realized by commercially available HTTP servers, such as the
4 Apache Web Server, Microsoft Internet Information Server, and Sun ONE Web Server.

5

6 The Application Server 11 includes a Subscriber Application Component 15, a
7 Client Application Component 17, Administration/Configuration Logic 19, Data Security
8 Logic 21, a Database 23 storing bills and invoices, Presentation Services 25, Network
9 Security Services 27, and possibly Messaging Logic 29. The
10 Administration/Configuration Logic 19 provides for system management and
11 configuration of the Application Server 11. The Presentation Services 25 are facilities
12 that enable delivering dynamic content to client browsers. Preferably, the Presentation
13 Services 25 support Active Server Pages, JavaServer pages, server-side scripting such as
14 Perl, CGI, PL/SQL scripting, etc. The Network Security Services 27 provides facilities
15 that enable maintaining network security (such as SSL-based or IPSec-based encryption
16 and authentication facilities). Preferably, the Application Server 11 is realized by a
17 commercially-available software framework, such as the WebLogic Platform
18 commercially available from BEA Systems of San Jose, CA, the Websphere Application
19 Server commercially available from IBM, Windows Server Systems commercially
20 available from Microsoft Corporation of Redmond, WA, or the SUN ONE Application
21 Server commercially available from Sun Microsystems of Santa Clara, CA.

22

1 The Subscriber Application component 15, works in conjunction with the
2 Presentation Services 25 and other components of the Application Server 11, to provide
3 dynamic content to the web server 5 for delivery to the browser-based Subscriber
4 Administrator/Staff system 3. The Subscriber Application component 15 also encodes
5 business logic that represents the Subscriber-side part of the invoicing process (e.g., the
6 creation, update, storage, and finalization of invoices on the part of the Subscriber
7 Administrator/Staff). It also updates state information that represents the status of
8 invoices in conjunction with this invoicing process.

9

10 The Client Application component 17, works in conjunction with the Presentation
11 Services 25 and other components of the Application Server 11, to provide dynamic
12 content to the web server 5 for delivery to the browser-based Client Administrator/Staff
13 system 9. The Client Application component 17 also encodes business logic that
14 represents the Client-side part of the invoicing process (e.g., the review,
15 approval/rejection, and payment of invoices on the part of the Client
16 Administrator/Staff). It also updates state information that represents the status of
17 invoices in conjunction with this invoicing process.

18

19 The billing information and invoices created and updated during the invoicing
20 process is stored in the database 23. The database 23 can be realized by files stored by
21 the application server 17. Alternatively, the database 23 can be realized by a relational
22 database that is part of the application server (as shown), or coupled thereto by an
23 appropriate database connector interface.

1

2 Data Security Logic 21 provides facilities that enable controlled-access to the
3 information stored in the database 23. In the invoicing system of the present invention,
4 the Data Security Logic 21 provides user-level access control to the billing information
5 and invoices that are created and maintained by the Subscriber-side part of the invoicing
6 process. For example, it is preferred that such information remain inaccessible to the
7 Client Administrator/Staff until an invoice is finalized for submission to the Client entity.
8 In addition, it is preferred that the Application Server 11 include Messaging Logic 29 that
9 provides facilities that support messaging between Subscriber Administrator/Staff and
10 Client Administrator/Staff. The messaging can be in the form of text messages, instant
11 messages, or e-mail messages.

12

13 The processing functionality provided by the Subscriber Application Component
14 15 is preferably logically partitioned into two parts: Subscriber-Administrator logic 31
15 and Subscriber-Staff logic 33. The Subscriber-Administrator logic 31 interacts with a
16 browser-based Subscriber-Administrator user to perform various functions as part of the
17 Subscriber-side invoice processing. Examples of such functions are described below
18 with respect to Figs. 2 through 4I. The Subscriber-Staff logic 33 interacts with a
19 browser-based Subscriber-Staff user to perform various functions as part of the
20 Subscriber-side invoice processing. Examples of such functions are described below
21 with respect to Fig. 5.

22

1 Similarly, the processing functionality provided by the Client Application
2 Component 17 is preferably logically partitioned into two parts: Client-Administrator
3 logic 35 and Client-Staff logic 37. The Client-Administrator logic 35 interacts with a
4 browser-based Client-Administrator user to perform various functions as part of the
5 Client-side invoice processing. Examples of such functions are described below with
6 respect to Figs. 6 through 7D. The Client-Staff logic 37 interacts with a browser-based
7 Client-Staff user to perform various functions as part of the Client-side invoice
8 processing. Examples of such functions are described below with respect to Fig. 8.

9

10 Turning now to Fig. 2, there is shown a high-level schematic representation of
11 exemplary functions provided by the Subscriber-Administrator logic 31. Such functions
12 include a block 201 that interacts with a browser-based Subscriber-Administrator user to
13 create a Client entity. An example of the graphical user interface that may be displayed
14 at the browser-based Subscriber-Administrator system 3 as part of block 201 is shown in
15 Fig. 3A. It enables the Subscriber-Administrator user to create a Client by entering the
16 Client name (labeled “Customer Name”), Client Administrator login name and password,
17 and Contact Name and address and contact information, and Location name and address
18 and contact information. Once the Client is set up, the Subscriber-Administrator user
19 turns over the Client-Administrator login name and password to the Client. The Client-
20 Administrator now becomes the Administrator for the Client account. If the Client is
21 currently using the system, the block 201 enables the Subscriber-Administrator to search
22 for the Client and assign the Client to his account.

23

1 The Subscriber-Administrator logic 31 also preferably includes a block 203 that
2 enables the Subscriber-Administrator user to create (or change) a contract (or project)
3 that pertains to a specific Client. An example of the graphical user interface that may be
4 displayed at the browser-based Subscriber-Administrator system 3 as part of block 203 is
5 shown in Fig. 3B. It enables the Subscriber-Administrator user to create a
6 contract/project by defining a contract name and time period (e.g., start date and end
7 date). The contract/project may have recurring periods (of one or more types) and may
8 be associated with only one location of the specific Client. The project/contract can also
9 specify rules and conditions that dictate how billing is carried out for the contract period.
10 For example, it can specify that all billing associated with this project/contract is pre-
11 approved. In this case, the billing information does not require approval by the specific
12 Client before it is accumulated into an invoice for submission to the specific Client. In
13 another example, it can specify a number of units (such as man-hours) that are billed free-
14 of-charge during the contract period, or a number of cutoff units (such as man-hours) and
15 associated billing rate adjustment. In this case, in the event that the number of units
16 billed in the contract period exceeds the number of cutoff units, the difference and billing
17 rate adjustment is used to determine the bill. In another example, the contract/project can
18 be setup to automatically generate invoices for specific Clients, or a Client and Location
19 combination. Preferably, only Subscriber-Administrator users are allowed create and
20 maintain contracts and projects.

21

22 The Subscriber-Administrator logic 31 also preferably includes a block 205 that
23 enables the Subscriber-Administrator user to create (or change) billing rates associated

1 with particular services (labeled “task) provided by the Subscriber entity to one or more
2 Client entities. An example of the graphical user interface that may be displayed at the
3 browser-based Subscriber-Administrator system 3 as part of block 205 is shown in Fig.
4 3C. It enables the Subscriber-Administrator user to define a billing rate for a given task.
5 The billing rate can be selectively applied to all Subscriber-staff members (or a particular
6 Subscriber-Staff member), to all clients (or a particular client), and/or to a particular
7 client location. The selections allow the same Subscriber-Staff member to be billed out
8 at varying rates for the same task for different Clients.

9

10 The Subscriber-Administrator logic 31 also preferably includes a block 207 that
11 enables the Subscriber-Administrator user to define a Subscriber-Staff member. An
12 example of the graphical user interface that may be displayed at the browser-based
13 Subscriber-Administrator system 3 as part of block 207 is shown in Fig. 3D. It enables
14 the Subscriber-Administrator user to create a Subscriber-Staff member by entering the
15 Subscriber-Staff name, Login name and password, other miscellaneous information (e.g.,
16 social security number, gender, salary, etc), and selecting one or more Clients that are
17 affiliated with the Subscriber-Staff member.

18

19 The Subscriber-Administrator logic 31 also preferably includes a block 209 that
20 enables the Subscriber-Administrator user to assign (and create) billing services (referred
21 to as “tasks”) associated with particular Client. An example of the graphical user
22 interface that may be displayed at the browser-based Subscriber-Administrator system 3
23 as part of block 209 is shown in Fig. 3E. It enables the Subscriber-Administrator user to

1 selectively assign one or more tasks to a particular Client (or all Clients), or to possibly a
2 particular Client location. The task is a short description of the services provided by the
3 Subscriber entity. Preferably, the billing tasks associated with a particular Client are used
4 only in conjunction with Time Billing of the particular Client.

5

6 The Subscriber-Administrator logic 31 also preferably includes blocks 211 and
7 213 that enable the Subscriber-Administrator to create (and maintain) Accounts Payable
8 information and Accounts Receivable Information as well as a General Ledger,
9 respectively. Such functionality is well known in the electronic-based accounting arts.
10 The integrated Accounts Payable functionality of block 213 enables the Subscriber-
11 Administrator to easily calculate payment for the Subscriber-Staff member(s). Within
12 this functionality, disbursements to the Subscriber-Staff can be easily generated and
13 managed throughout the system. For example, profit and loss reports can be generated to
14 analyze the billed vs. compensation for any Subscriber-Staff member(s). Such profit and
15 loss reports is derived from the same data that is entered for billing by the Subscriber-
16 Staff member(s) (see block 501 of Fig. 5 and accompanying description). The
17 Subscriber-Staff also has access to disbursements made to them (see block 503 of Fig. 5
18 and accompanying description), and checks are generated using existing staff
19 information, reducing duplicate data entry. Note that Accounts Payable information and
20 Accounts Receivable information is not available to Client users (e.g., Client-
21 Administrators and/or Client-Staff).

22

1 The Subscriber-Administrator logic 31 also preferably includes a block 215 that
2 enables the Subscriber-Administrator user to enter (or update) time-based billing
3 information for a particular Client. An example of the graphical user interface that may
4 be displayed at the browser-based Subscriber-Administrator system 3 as part of block 215
5 is shown in Fig. 4A. It enables the Subscriber-Administrator user to enter time-based
6 billing information for a specific Client and Location. It also enables the Subscriber-
7 Administrator user to select a contract/project of the particular Client and (and possibly a
8 task assigned to the particular Client and contract/project). The description of the
9 services provided (labeled “billing description”) can be selected from a pull-down menu
10 as shown and then edited. The user selects from a pop-up calendar (or manually enters)
11 the date that the services are provided. Total units are automatically calculated based on
12 the Start and End time entered by the user, unless the user enters a number in the Total.
13 In this case, the Start and End Times are ignored. Free Units are subtracted from the
14 Total Units. The billing information entered (or updated) in block 215 is stored in the
15 database 23 for subsequent access therefrom.

16

17 The Subscriber-Administrator logic 31 also preferably includes blocks 217 and
18 219 that enable the Subscriber-Administrator user to enter one-time billing information or
19 other miscellaneous billing information (such as expenses or other non-time related
20 billing information) for a particular Client, respectively. An example of the graphical
21 user interface that may be displayed at the browser-based Subscriber-Administrator
22 system 3 as part of block 217 is shown in Fig. 4B. It enables the Subscriber-
23 Administrator user to enter billing information for a specific Client and Location. It also

1 enables the Subscriber-Administrator user to select a contract/project of the particular
2 client. The user enters the date that the goods or services are provided, a description of
3 such goods or services to be billed, and cost information (e.g., number of units, unit cost,
4 tax rate) for such goods or services. A similar graphical user interface may be displayed
5 at the browser-based Subscriber-Administrator system 3 as part of block 219. The billing
6 information entered (or updated) in blocks 217 and 219 is stored in the database 23 for
7 subsequent access therefrom.

8

9 The Subscriber-Administrator logic 31 also preferably includes a block 221 that
10 enables the Subscriber-Administrator user to process and administer billing information
11 stored in the database 23. An example of a graphical user interface that may be displayed
12 at the browser-based Subscriber-Administrator system 3 as part of block 221 is shown in
13 Fig. 4C. It enables a Subscriber-Administrator user to edit/update a billing entry stored in
14 the database 23, and approve the billing entry for submission to the Client. By selecting
15 the Submit action text, the block 221 cooperates with the Data Security Logic 21 to
16 enable one or more Client-Administrator users (and possibly one or more Client-Staff
17 users) to access the billing entry stored in the database 23 for subsequent access
18 therefrom. A more detailed description of the role-based access controls for a billing
19 entry during the invoicing process is set forth below with respect to Fig. 9.

20

21 The Subscriber-Administrator logic 31 also preferably includes a block 223 that
22 enables the Subscriber-Administrator user to create (and process) invoices that are
23 derived from the billing information stored in the database 23. An example of the

1 graphical user interfaces that may be displayed at the browser-based Subscriber-
2 Administrator system 3 as part of block 223 are shown in Figs. 4D, 4E and 4F. The
3 graphical user interface of Fig. 4D enables the Subscriber-Administrator user to create an
4 invoice for a specific Client and Location and user-selected date range. The user enters
5 the date for the invoice and possibly other information (e.g., invoice type, due date,
6 account that will be paid, purchase order code, etc). When the user selects the create
7 button, the functionality of block 221 queries the database 23 to identify the billing
8 information stored therein that pertains to the specific Client and Location and falls
9 within the user-selected date range (and which has been approved by the Client and has
10 not yet been incorporated into an invoice), adds such billing information to an invoice,
11 and displays information for the invoice (such as the invoice date, Client, dollar amount
12 for the invoice, billing descriptions and dates for the billing information from which the
13 invoice is derived, etc). The graphical user interface of Fig. 4E enables the Subscriber-
14 Administrator user to finalize (sometimes referred to herein as “post” or “posting”) an
15 invoice for submission to the Client. By selecting the Post action text, the block 223
16 cooperates with the Data Security Logic 21 to enable one or more Client-Administrator
17 users (and possibly one or more Client-Staff users) to access the invoice entry stored in
18 the database 23 for subsequent access therefrom. The graphical user interface of Fig. 4F
19 enables the Subscriber-Administrator user to cancel the post of an invoice for submission
20 to the Client. By selecting the Cancel action text, the block 223 cooperates with the Data
21 Security Logic 21 to disable Client-Administrator users (and Client-Staff users) access to
22 the invoice entry stored in the database 23. In this manner, the invoice entry reverts back
23 to being hidden from the Client-Administrator users (and Client-Staff users) of the

1 system. A more detailed description of the role-based access controls of an invoice
2 during the invoicing process is set forth below with respect to Fig. 10. Preferably, an
3 invoice is identified with a date when it is OPEN (i.e., it has not been finalized/posted).
4 After finalization, a number is assigned to the invoice and that is the number that is
5 referenced throughout the life of the invoice.

6

7 The Subscriber-Administrator logic 31 also preferably includes a block 225 that
8 enables the Subscriber-Administrator user to generate (and print) reports related to billing
9 entries and invoices stored in the database 23. An example of the graphical user
10 interfaces that may be displayed at the browser-based Subscriber-Administrator system 3
11 as part of block 225 are shown in Figs. 4G, 4H and 4I. The graphical user interface of
12 Fig. 4G enables the Subscriber-Administrator user to specify a Client (or Client-
13 Location) and possibly specify a date range and/or other criteria. Upon selection of the
14 view report button, the billing entry(ies) and/or invoices stored in the database 23 that
15 match the user-specified criteria are displayed as a report. An example of a report of
16 billing information is shown in Fig. 4H. An example of a report for invoices is shown in
17 Fig. 4I, which enables the Subscriber-Administrator user to edit, update and process an
18 invoice by selecting the Invoice number action text. It also enables the Subscriber-
19 Administrator user to apply and reconcile payment of the invoices by entering the
20 appropriate information.

21

22 Turning now to Fig. 5, there is shown a high-level schematic representation of
23 exemplary functions provided by the Subscriber-Staff logic 33. Such functions include a

1 block 501 that interacts with a browser-based Subscriber-Staff user to enter (or update)
2 billing information for a particular Client. Such billing information can be time-based
3 billing information, one time billing information, or other miscellaneous billing
4 information. The billing information entered (or updated) in block 501 is stored in the
5 database 23 for subsequent access. Graphical user interfaces similar to those described
6 above with respect to Figs. 4A, 4B and 4C may be displayed at the browser-based
7 Subscriber-Staff system 3 as part of block 501. Preferably, billing entries created by the
8 Subscriber-Staff user can be readily updated by the Subscriber-Staff user until it is
9 submitted by the Subscriber-Staff user. Upon submission, a billing entry can be accessed
10 and viewed by the Subscriber-Staff user, but can be edited only by a Subscriber-
11 Administrator user. The Subscriber-Administrator user then approves the billing entry for
12 submission to the Client as described above with respect to Fig. 4C.

13

14 The Subscriber-staff logic 33 also preferably includes block 503 that enables the
15 Subscriber-Staff user to generate (and print) reports related to billing entries created (or
16 updated) by the specific Subscriber-Staff user and stored in the database 23. Graphical
17 user interfaces similar to those described above with respect to Figs. 4G and 4H may be
18 displayed at the browser-based Subscriber-Staff system 3 as part of block 503. In this
19 case, the displayed billing entries pertain to the Subscriber-staff user. Moreover, the
20 functionality of block 503 preferably enables the Subscriber-Staff user to access
21 disbursements made to the user as part of the Accounts Payable functionality of block
22 211 (described above with respect to Fig. 2).

23

1 In the event that a given Subscriber-staff user performs services for multiple
2 Client entities of the system, it is preferred that the authentication facilities (e.g., login
3 name and password) for the Subscriber-staff user provide access to the billing data for the
4 multiple Clients. This minimizes the complexity of the authentication process of the
5 Subscriber-staff user (for example, the user need not remember and/or enter separate
6 passwords for each Client).

7

8 The Subscriber-Staff logic 33 may also provide a number of unique features that
9 are afforded to the Subscriber-Staff members, including generating a report of earnings
10 for a time period (which is preferably specified by user input) and any checks that were
11 generated through the system.

12

13 Turning now to Fig. 6, there is shown a high-level schematic representation of
14 exemplary functions provided by the Client-Administrator logic 35. Such functions
15 include a block 601 that interacts with a browser-based Client-Administrator user to
16 create (or update) a Client-Staff member for the Client entity to whom the Client-
17 Administrator belongs. A graphical user interface similar to that described above with
18 respect to Fig. 3D may be displayed at the browser-based Client-Administrator system 9
19 as part of block 601 is shown in Fig. 3D. It enables the Client-Administrator user to
20 create (or update) a Client-Staff member by entering the Client-Staff name, Login name
21 and password, other miscellaneous information (e.g., social security number, gender,
22 salary, etc), and selecting one or more Subscribers that are affiliated with the Client-Staff
23 member.

1

2 The Client-Administrator logic 35 also preferably includes a block 603 that
3 enables the Client-Administrator user to create (or update) one or more locations (e.g.,
4 Department, Division, Branch Office, etc.) of the Client entity to which the Client-
5 Administrator logic belongs. Preferably, in block 603, the Client-Administrator user
6 enters (or updates) the name, address, and other miscellaneous information (such as
7 location contact information) for the location. In addition, in block 603, the Client-
8 Administrator user preferably can assign one or more Client-Staff members to one or
9 more locations.

10

11 The Client-Administrator logic 35 also preferably includes a block 605 that
12 enables the Client-Administrator user to create (or change) a contract (or project) for the
13 Client entity to whom the Client-Administrator belongs. A graphical user interface
14 similar to that described above with respect to Fig. 3B may be displayed at the browser-
15 based Client-Administrator system 9 as part of block 605. It enables the Client-
16 Administrator user to create a contract/project by defining a contract name and time
17 period (e.g., start date and end date). The contract/project may have recurring periods (of
18 one or more types) and may be associated with one or more locations of the Client. The
19 project/contract can also specify rules and conditions that dictate how billing is carried
20 out for the contract period. For example, it can specify that all billing associated with this
21 project/contract is pre-approved. In this case, the billing information does not require
22 approval by the Client before it is accumulated into an invoice for submission to the
23 Client. In another example, the contract/project can be set up to automatically generate

1 invoices for specific Clients, or a Client and Location combination. Preferably, only
2 Client-Administrator users are allowed create and maintain contracts and projects.
3

4 The Client-Administrator logic 35 also preferably includes a block 607 that
5 enables the Client-Administrator user to process and administer billing information stored
6 in the database 23 that pertain to the specific Client to whom the Client-Administrator
7 belongs. An example of a graphical user interface that may be displayed at the browser-
8 based Client-Administrator system 9 as part of block 607 is shown in Fig. 7A. It enables
9 a Client-Administrator user to review and approve billing entries stored in the database
10 23 that pertain to a specific Subscriber entity. The specific Subscriber entity is associated
11 with the Client entity to whom the Client-Administrator belongs. Approval is
12 accomplished by selecting the Approval All action text for a given billing entry.
13 Preferably, such approval enables the billing entry to be added to an invoice by the
14 specific Subscriber as described below with respect to Fig. 9. In the processing of block
15 607, billing entries that are “OPEN” and have yet to be “FINALIZED” by the specific
16 Subscriber are not accessible to any Client-Administrator user (or any Client-Staff user).
17 Thus, only the billing entries that have been “FINALIZED” by the specific Subscriber are
18 accessible to the Client-Administrator user for review and approval.
19

20 The Client-Administrator logic 35 also preferably includes a block 609 that
21 enables the Client-Administrator user to process and administer invoices that are derived
22 from the billing information stored in the database 23. An example of a graphical user
23 interface that may be displayed at the browser-based Client-Administrator system 9 as

1 part of block 609 is shown in Fig. 7B. It enables the Client-Administrator user to review
2 the invoices for one or more specific Subscribers (and possibly for other user selected
3 criteria such as a particular Subscriber, Client-Location, user-selected date range etc).
4 The specific Subscriber(s) are associated with the Client entity to whom the Client-
5 Administrator belongs. When the user selects the invoice identifier action text, the
6 details of the invoice are displayed for review by the Client-Administrator user.
7 Preferably, block 609 also enables the Client-Administrator user to initiate payment (e.g.,
8 full payment or partial payment) for a particular invoice (or provide an indication of such
9 payment), which changes the state of the invoice. This state change is accessible to the
10 Subscriber that submitted the invoice as described below with respect to Fig. 10. In the
11 processing of block 609, invoices that are “OPEN” and have yet to be “COMMITTED”
12 by the specific Subscriber(s) of the Client are not accessible to any Client-Administrator
13 user (or any Client-Staff user). Thus, only the invoices that have been “COMMITTED”
14 by the specific Subscriber(s) are accessible to the Client-Administrator user for review
15 and administration. In block 609, payment of one or more invoices may be accomplished
16 by a payment transaction electronically submitted to the bank of the Subscriber or an
17 Automated Clearing House, by an automated credit card (or debit card) transaction, or by
18 other electronic payment settlements means. Alternatively, the payment of one or more
19 invoices may be accomplished by traditional payment mechanisms, such as mailing a
20 paper check to the specific Subscribers.

21

22 The Client-Administrator logic 35 also preferably includes a block 611 that
23 enables the Client-Administrator user to generate (and print) reports related to billing

1 entries and invoices stored in the database 23. A graphical user interface similar to that
2 shown in Fig. 4G may be displayed at the browser-based Client-Administrator system 9
3 as part of block 611, which enables the Client-Administrator user to specify a Subscriber
4 (and possibly Client-Location) and possibly specify a date range and/or other criteria.
5 Upon selection of the view report button, the billing entry(ies) and/or invoices stored in
6 the database 23 that match the user-specified criteria are displayed as a report. An
7 example of a report of billing information is shown in Fig. 7C. An example of a report
8 for invoices is shown in Fig. 7D.

9

10 Turning now to Fig. 8, there is shown a high-level schematic representation of
11 exemplary functions provided by the Client-Staff logic 37. Such functions include a
12 block 801 that interacts with a browser-based Client-Staff user at Client system 9 to
13 generate (and print) reports related to billing entries created (or updated) by the specific
14 Client-Staff user and stored in the database 23. Graphical user interfaces similar to those
15 described above with respect to Figs. 4G and 4H may be displayed at the browser-based
16 Client-Staff system 9 as part of block 801. In this case, the displayed billing entries
17 pertain to the Client-Staff user.

18

19 Turning now to Fig. 9, there is shown a schematic diagram that illustrates various
20 states of a billing entry through the invoicing process carried out by the invoicing system
21 of Fig. 1 in accordance with the present invention. In each state, a set of security
22 classifications (denoted “Y” for access granted, and “N” for access not granted) dictate
23 access to the billing entry by Subscriber-Administrator users (denoted “S-A”),

- 1 Subscriber-Staff users (denoted “S-S”), Client-Administrator users (denoted “C-A”), and
- 2 Client-Staff users (denoted “C-S”) in the state.

3

- 4 When a billing entry is created (or updated), it has an “OPEN” state. In the
- 5 “OPEN” state, Subscriber-Administrator users and those Subscriber-Staff users that
- 6 created (or added to) the billing entry can access the billing entry. However, the Client-
- 7 Administrator users and Client-Staff users cannot access the billing entry.

8

- 9 When a Subscriber-Administrator user approves the billing entry, the state of the
- 10 billing entry transitions to the “FINALIZED” state. In the “FINALIZED” state,
- 11 Subscriber-Administrator users and those Subscriber-Staff users that created (or added to)
- 12 the billing entry can access the billing entry. In addition, the Client-Administrator users
- 13 and those Client-Staff users designated by a Client-Administrator can also access the bill.
- 14 The application server 11 may cooperate with messaging logic 29 to notify a designated
- 15 Client-Administrator of the submission of the billing entry by the Subscriber entity to the
- 16 Client for approval by the client.

17

- 18 When a Client-Administrator user (or possibly a designated Client-Staff user)
- 19 approves a “FINALIZED” billing entry, the state of the billing entry transitions to the
- 20 “APPROVED BY CLIENT” state. In the “APPROVED BY CLIENT” state, Subscriber-
- 21 Administrator users and those Subscriber-Staff users that created (or added to) the billing
- 22 entry can access the billing entry. In addition, the Client-Administrator users and those
- 23 Client-Staff users designated by a Client-Administrator can also access the billing entry.

1 The application server 11 may cooperate with messaging logic 29 to notify a designated
2 Subscriber-Administrator of the approval of the billing entry by the Client. Note that in
3 some cases (for example, where the billing entry is associated with a contract/project for
4 which automatic invoicing has been selected), the state of the billing entry automatically
5 transitions from the “FINALIZED” state to the “APPROVED BY CLIENT” state
6 without Client approval. Preferably, in the “APPROVED BY CLIENT” state, the billing
7 information in the billing entry can be added to an invoice; while, in the other states, the
8 billing information in the billing entry cannot be added to an invoice.

9

10 When a Client-Administrator user (or possibly a designated Client-Staff user)
11 rejects a FINALIZED” billing entry, the state of the billing entry transitions to the
12 “REJECTED BY CLIENT” state. In the “REJECTED BY CLIENT” state, Subscriber-
13 Administrator users and those Subscriber-Staff users that created (or added to) the billing
14 entry can access the billing entry. In addition, the Client-Administrator users and those
15 Client-Staff users designated by a Client-Administrator can also access the bill. The
16 application server 11 may cooperate with messaging logic 29 to notify a designated
17 Subscriber-Administrator of the rejection of the billing entry by the Client. The
18 Subscriber entity is then free to re-open the billing entry for adjustment, clarification, or
19 resubmission. In this case, the state of the billing entry reverts back to the “OPEN” state
20 and the process begins again.

21

22 Turning now to Fig. 10, there is shown a schematic diagram that illustrates
23 various states of an invoice through the invoicing process carried out by the invoicing

1 system of Fig. 1 in accordance with the present invention. In each state, a set of security
2 classifications (denoted "Y" for access granted, and "N" for access not granted) dictate
3 access to the billing entry by Subscriber-Administrator users (denoted "S-A"),
4 Subscriber-Staff users (denoted "S-S"), Client-Administrator users (denoted "C-A"), and
5 Client-Staff users (denoted "C-S") in the state.

6

7 When an invoice is created (or updated), it has an "OPEN" state. In the "OPEN"
8 state, Subscriber-Administrator users can access the invoice. However, the Subscriber-
9 Staff users, Client-Administrator users and Client-Staff users cannot access the invoice.

10

11 When a Subscriber-Administrator user posts the invoice, the state of the billing
12 entry transitions to the "COMMITTED" state. In the "COMMITTED" state, Subscriber-
13 Administrator users can access the invoice, while the Subscriber-Staff users cannot
14 access the invoice. In addition, the Client-Administrator users and those Client-Staff
15 users designated by a Client-Administrator can also access the invoice. The application
16 server 11 may cooperate with messaging logic 29 to notify a designated Client-
17 Administrator of the posting of the invoice by the Subscriber entity to the Client for
18 payment by the Client.

19

20 When a Client-Administrator user (or possibly a designated Client-Staff user)
21 initiates full-payment (or provides an indication of such full-payment) for a
22 "COMMITTED" invoice, the state of the invoice transitions to the "PAID-IN-FULL"
23 state. In the "PAID-IN-FULL" state, Subscriber-Administrator users can access the

1 invoice, while the Subscriber-Staff users cannot access the invoice. In addition, the
2 Client-Administrator users and those Client-Staff users designated by a Client-
3 Administrator can also access the invoice. The application server 11 may cooperate with
4 messaging logic 29 to notify a designated Subscriber-Administrator of the full-payment
5 of the invoice (or indication thereof) by the Client.

6

7 When a Client-Administrator user (or possibly a designated Client-Staff user)
8 initiates partial-payment (or provides an indication of such partial-payment) for a
9 “COMMITTED” invoice, the state of the invoice transitions to the “PAID-IN-PART”
10 state. In the “PAID-IN-PART” state, Subscriber-Administrator users can access the
11 invoice, while the Subscriber-Staff users cannot access the invoice. In addition, the
12 Client-Administrator users and those Client-Staff users designated by a Client-
13 Administrator can also access the invoice. The application server 11 may cooperate with
14 messaging logic 29 to notify a designated Subscriber-Administrator of the partial-
15 payment of the invoice (or indication thereof) by the Client. The Subscriber entity is then
16 free to re-open the invoice for adjustment, clarification, or resubmission. In this case, the
17 state of the invoice reverts back to the “OPEN” state and the process begins again.

18

19 Advantageously, the electronic-based invoicing systems of the present invention
20 provides for seller-side processing that enables real-time entry and maintenance of billing
21 information and creation of invoices derived from such billing information as well as
22 buyer-side processing that enables efficient approval and payment of invoices. This

1 highly integrated architecture provide for a lower cost invoicing solution to both sellers
2 and buyers and thus opens up new markets for such advanced invoicing functionality.

3

4 There have been described and illustrated herein several embodiments of systems
5 and methods for carrying out electronic bill presentment and invoicing. While particular
6 embodiments of the invention have been described, it is not intended that the invention be
7 limited thereto, as it is intended that the invention be as broad in scope as the art will
8 allow and that the specification be read likewise. Thus, while particular invoicing
9 processes has been disclosed, it will be appreciated that other invoicing processes can be
10 realized as well. For example, and not by way of limitation, the roles of the subscriber
11 users and client users of the system can be readily adapted to accommodate variations in
12 the invoicing process carried out by the system. Such role changes result in adaptations
13 to the logical components of the application server that carry out the invoicing process.
14 Also, while preferred system architectures, graphical user interfaces, and underlying
15 functional logic has been disclosed, it will be understood that modifications thereto can
16 be similarly used. It will therefore be appreciated by those skilled in the art that yet other
17 modifications could be made to the provided invention without deviating from its spirit
18 and scope as claimed.